California Partnership for the San Joaquin Valley
Energy Work Group
Strategic Action Proposal
September 2006

I. Mission Statement

The mission of the Energy Work Group is to promote environmentally-friendly renewable and alternative energy sources to ensure an adequate reliable supply.

II. Background

A. Scope Adopted by Partnership

Note: The Energy Work Group was originally a sub-group of the Water Quality, Supply, Reliability and Energy Work Group. The Energy sub-group has since become its own Work Group, but the scope adopted by the Partnership Board reflects the original, larger grouping.

- Survey all relevant state, federal and local agencies, entities and individuals regarding existing needs, water projects and institutional barriers. Utilize the information in DWR Bulletin 160 and coordinate all activities with the San Joaquin Valley Regional Water Plan being developed.
- Organize survey information into a database to catalogue water-related needs: (a) water supply; (b) water quality; (c) flood control; and (d) environmental enhancement.
- Delineate legal and institutional barriers to meeting regional water-related needs.
- Develop a Water Master Plan and Business Plan, including a focus on flood control.
- Develop a strategic plan for energy supply, alternative renewable resources, and efficiencies, beginning with the California Energy Commission Integrated Energy Policy Report.

B. Overall Vision for Energy in the San Joaquin Valley

By 2017 the vision for the Energy Work Group is to have adequate, diverse supplies of clean, locally produced energy to provide for overall water-energy requirements in the growing eight county San Joaquin Valley Region. Clean, abundant energy is viewed from the same responsible stewardship perspective as clean water and clean air and is treated as a treasured environmental resource. The water-energy stewardship vision applies to all sectors of the region to include rural, urban, municipal, commercial, industrial, governmental, agricultural, and investor owned utilities. (Source: A Clean Energy Roadmap for the Greater Fresno Area, March 2006; Great Valley Center, Strategic Energy Innovations, Regional Jobs Initiative)

C. Water-Energy Resource Stewardship

California consumers use energy to collect, move, and treat water, dispose of wastewater, power large and small pumps to heat, cool and pressurize water for use in homes, businesses, farms and factories. Combined, these water-related end uses account for about 20% of the state's overall

electricity consumption, annually cost California consumers about $2 billion, consume about one-third of the non-power plant natural gas and about 3% of diesel fuel consumed. Urban water supply and treatment and residential, commercial and industrial end-uses account for almost four-fifths of the water-related electricity consumption, while agriculture consumes the remaining one-fifth. The San Joaquin Valley is expected to require an additional 3,500 megawatts of new electricity generation capacity by 2025 to meet projected growth. (Source: 2005 Integrated Energy Policy Report from the California Energy Commission)

Primary opportunity areas for water-energy resource stewardship:

Water-Energy Diagnostic, Repair/Retrofit and Education Programs Across All Sectors

- Well crafted, incentivized water conservation and water use efficiency programs across all urban, agricultural, industrial, commercial, and governmental segments to reduce water consumption during peak electrical generation periods. Promotion of accepted urban water use Best Management Practices (BMPs) and agricultural Efficient Water Management Practices (EWMP's) in all water applications. An acre-foot or MGD of water not used is an acre-foot or MGD not pumped.
- Aggressive electrical, natural gas and diesel end-user energy efficiency diagnostic and retrofit programs to significantly reduce kilowatt-hours, therms and diesel for power production and water heating.
- Aggressive region-wide Energy Star™ and SWAT™* retrofit programs to encourage wise first purchase and/or replacement of inefficient water/energy appliances, pumps, valves, landscape controllers, filters and other water/energy appurtenances

*SWAT™ = Smart Water Application Technologies Irrigation Association

Water Agency Regulatory and Process Enhancements

- Widespread utilization of Time of Use (TOU) water tariffs and installation of TOU water meters across all segments provides an excellent opportunity to encourage customers to reduce water usage during peak electrical use periods by providing a more accurate assessment of the time-value of water.
- Promotion and funding of water utility and Investor Owned Utility (PG&E, SCE & Munis) storage of pumped water between linked reservoir pairs and expanded storage tanks for filling during off-peak periods and later use during peak periods.
- Increase water and wastewater treatment process efficiency for reduced on-peak and off-peak load shifting. Enable water utilities to self-generate and wheel power within their own electrical distribution systems.
- Enable water utilities to self-generate and wheel power to other facilities operated by the same utilities.

New Energy-Efficient Water Resource Development

- Encourage and incentivize the reclamation and widespread use of urban wastewater and agricultural brackish water for regional non-potable uses such as parks, golf courses, crop irrigation, and landscaping. Use reclaimed agricultural brackish water for high-value crops or potable urban uses if practical.

New Environmentally-Friendly Energy Development

- Encourage and incentivize widespread adoption of renewables such as solar energy for water, wastewater, and agricultural, commercial and industrial applications to embrace peak generation capability of solar power in the San Joaquin Valley. An example would be the International Center for Water Technology (ICWT) Solar Initiative which envisions conversion of 200 megawatts of water community electricity applications to solar energy over a ten year period. Additional benefits of large-scale solar energy applications include cleaner air, small environmental footprint combined with distributed generation capability, minimal permitting and construction delays compared with central station power plants and typically available open solar array siting areas that water agencies enjoy.
- Encourage and incentivize the use of bio-based energy for water and wastewater co-generation and industrial applications such as combustion of methane from on-site digesters and nearby dairies, and utilization of orchard prunings and waste urban wood for direct combustion and gasifier biomass plants.

- Develop an appropriate regulatory framework to encourage and incentivize the development of water agency local use distributed generation, an expansion of Net-Metering and facilitate grid interconnections with new renewable energy sources by partnering with the Governor, IOUs, Munis, the California Public Utility Commission, California Energy Commission and the California Legislature.

III. Goals and Objectives

A. Narrative

1. Goal 1: Well crafted and executed water/energy conservation and education programs for repair and retrofit of existing equipment across urban, commercial, industrial, agricultural and municipal sectors.

a. Metrics – Within a ten-year period:

- All provider synergized water/energy conservation, repair and retrofit and education programs reduce current power use by 5% and water usage by 5% over current (2006) usage levels. (PG&E, SCE, contractors, third-party vendors, Regional Energy Offices and partnerships, Munis, and others)

b. Objectives

- **Objective A: Ensure full convergence between energy conservation/efficiency and water conservation/efficiency at all levels (CPUC, PG&E, SCE, DWR, CEC).**
  Current California public policy and funding ignores the direct connection between energy conservation/efficiency and water conservation/efficiency programs and promulgates a continuing disconnect between the elements. Energy conservation/efficiency programs are well funded by ratepayers via the Public Goods Charge, while water conservation/efficiency is funded at very low levels compared to the public benefits possible. Collaboration across agencies, utilities

and commissions must occur if the benefits of fully engaging the water/energy connection are to be achieved.

- **<u>Objective B:</u> Design and implement well crafted water/energy conservation diagnostic, repair/retrofit and education programs in agricultural, water agency, and water/wastewater sectors.**
  Current utility conservation/efficiency programs focus only on energy and have little or no convergence with water conservation/efficiency opportunities even in agricultural, agency, water/wastewater applications. Similarly DWR water conservation/efficiency programs typically focus only on water and not on energy conservation/efficiency opportunities.

- **<u>Objective C:</u> Design and implement well crafted water/energy conservation diagnostic, repair/retrofit and education programs in urban areas. Utilize Energy Star™ and SWAT™ equipment purchase models fort highest efficiency.**
  Urban and commercial energy conservation/efficiency programs rarely connect with water conservation/efficiency programs for the benefit of both and for the benefit of California Utility sponsors (PG&E, SCE, Muni's) typically do not collaborate with water program sponsors (DWR, SWRCB, Bureau of Reclamation, others) for the benefit of all participants. A well crafted, collaborative water/energy conservation/efficiency program in urban and commercial sectors would provide measurable cost and resource savings.

2. Goal 2: Well crafted water agency regulatory and process enhancements.

a. Metrics – Within a ten-year period:

- Utilities and water agencies synergize water tariffs (rates) and energy tariffs (rates) on a pilot program basis to encourage water/energy conservation for both resources. If pilot programs prove to be successful, adopt on a more widespread basis.

b. Objectives

- **<u>Objective A:</u> Synergize water tariffs and energy tariffs to save water/energy where possible.**
  Establish a utility, water agency, California agency/commission task force to synergize water tariffs and energy tariffs on a pilot program basis to encourage the conservation/efficiency of both resources. Adopt on a more widespread basis if pilot program is successful. Water usage during peak electrical usage periods should have a higher value than water used during off-peak periods.

- **<u>Objective B:</u> Install Time of Use (TOU) water meters with cooperating agencies on a pilot basis to encourage reduced energy consumption during peak electrical usage periods.**
  TOU electrical meters are widely used as a management tool; however, TOU water meters are not typically used as an educational and incentive opportunity. A

successful pilot effort will encourage water usage during peak periods be delayed until off-peak periods.

- **<u>Objective C:</u> Expand utility owned off-peak paired reservoirs to enable more peak period energy availability.**
  Primarily utility and municipally owned paired reservoirs with daytime electrical generation and nighttime refill capability have provided excellent peak period reserve capability. Expansion of such projects where possible and environmentally benign should be encouraged by agencies, commissions and public policy.

- **<u>Objective D:</u> Expand water agency storage tank and operational software programs to expand safe-system drawdown during peak electrical usage periods.**
  Water agencies must maintain sufficient storage tank operating reserves for use during peak water usage periods. If water storage space is expanded and the entire system is designed correctly, then less peak pumping power will be required, freeing up power that would otherwise be consumed during the peak. Well crafted software programs are also available to safely increase tank drawdown levels without endangering system supply or running out of water.

3. Goal 3: New energy-efficient water resource development.

a. Metrics – Within a ten-year period:
- Five operational recycled and three brackish water recycling facilities.

b. Objectives
- **<u>Objective A:</u> Site, design, build and commission five recycled water recycling plants.**
  Gray water has long been used as a valuable resource for non-potable uses throughout California and the United States. Well designed, constructed and operated non-potable systems can greatly reduce the amount of fresh water that must be imported into a region. Excellent resources are available to guide the process.

- **<u>Objective B:</u> Site, design, build and commission three brackish water recycling plants.**
  Over 300,000 acres of farmland on the west side of the San Joaquin Valley are impacted by perched water tables with no outlet for subsurface drainage water resulting from applied fresh irrigation water. Treated brackish water is an excellent freshwater source and requires far less process energy than does seawater. Treated brackish water would make an excellent potable water source for both small west side communities and larger communities that could afford pumping and distribution costs.

4. Goal 4: New environmentally-friendly energy development.

a. Metrics – Within a ten-year period:

- Convert 200 megawatts of water community facilities to grid-tied solar systems.
- Site, design, finance and commission ten methane powered plants at wastewater community sites and dairies in the San Joaquin Valley.
- Site, design, finance and commission ten small-scale co-generation gasifier plants fueled by almond prunings and waste urban wood.

b. Objectives

- **<u>Objective A:</u> Implement a water-based Solar Initiative to convert 200 megawatts of water community-based energy applications to grid-tied solar systems.**
  A water-based Solar Initiative would provide a great many benefits to the region, including distributed generation, locally produced renewable electricity, peak-generation capabilities that meet regional peak power needs, greatly reduced environmental footprint for air emissions and CO_2, short lead time for permitting process and commissioning, and minimal large power line extensions required. Additional funding sources for "back-half" funding of solar arrays from a combination of public and private financing sources would speed adoption.

- **<u>Objective B:</u> Site, design, build and commission ten methane powered co-generation plants at wastewater community and dairy locations in the San Joaquin Valley.**
  Electricity and steam from methane generator digesters producing energy in a co-generation application at water community or dairy facilities are an excellent source for on-site power and grid-tied power. Additional power is developed with a small environmental footprint and ancillary air quality benefits.

- **<u>Objective C:</u> Site, design, and build ten biomass small-scale co-generation gasifier plants fueled by orchard prunings and waste urban wood either at existing direct combustion biomass plants or stand-alone locations.**
  Gasifiers combust waste wood in the absence of oxygen and produce fair quality wood gas that can be utilized in internal combustion engines or mini-turbines. Resulting electricity and steam or hot water can be utilized as a co-generation resource. Air emissions are reduced from typical direct combustion biomass plants. Direct combustion biomass plants do have excellent existing facilities and an incoming fuel stream that could greatly benefit gasifiers as a startup energy source.

5. Goal 5: Governor's Summit to facilitate early adoption of converged water-energy opportunities.

a. Metrics – Within a two-year period:

- Convene and implement findings of a Governor's Water-Energy Summit to provide for a seamless interface at the water-energy to speed early adoption of

favorable policies and regulatory that will benefit appropriate resource stewardship.

b. Objectives

- **<u>Objective A:</u> Seamless integration of California resources at the water-energy interface.**
  Water and energy agencies, utilities, regulatory agencies and commissions operate at cross-purposes when water energy resources are viewed holistically from a resource stewardship perspective. Many noteworthy examples exist. To name only a few: very well funded energy conservation/efficiency programs ($2 billion 2006-2008) versus very low intermittent bond funding for water conservation; disconnect between incentivized equipment purchases to save energy versus similar purchases to save water; public policy disconnect between encouraging water agencies to self-generate power and facilitate internal wheeling of self-generated power within agency boundaries; resistance to substantial Net-Metering for environmentally benign energy sources with major air quality benefits (methane co-generation plants & gasifiers). The list goes on and on because of a vision of water and energy as being unrelated. A major Governor's Summit on converging water and energy opportunities with all the major players would be of major long-term benefit to California.

B. At-A-Glance Matrix

IV. Resources for Implementation

A. Existing Resources

A number of resources exist for addressing either water conservation/efficiency or energy conservation/efficiency but not both in the same framework. Energy resources for conservation/efficiency are typically derived from the ratepayer funded Public Goods Charge. As of 2006 all Public Goods monies for energy efficiency and conservation are the direct responsibility of PG&E and SCE under the direction of the California Public Utilities Commission. The CPUC has budgeted almost $2 billion for energy efficiency throughout California during the period 2006-2008. A good portion of the energy efficiency monies are spent in the San Joaquin Valley; however, the Valley is a net contributor to the statewide Public Goods Funds pool. A re-ordering of priorities may be necessary to accomplish the Partnership's goals and objectives.

Water conservation/efficiency funds are typically sourced through California bond issues and delivered via programs operated by DWR or the SWRCB. Typically the water/energy connection is not a priority item in the selection of projects. Other items like water quality, quantity, and environmental restoration have higher priorities. All current water bond monies are currently obligated. A water bond is scheduled for voter review in November 2006. Water/energy priorities in the bond language are unknown at this point. It also appears that for whatever reason, there are notable inequities in project selection for projects proposed from the San Joaquin Valley. Additional bond monies, federal funds or private sector funds will need to be committed to complete goals indicated in the Strategic Action Proposal.

B. Additional Resources

Additional resources will be required to complete the goals indicated for the Energy Work Group. The following table is a best estimate of amount and timing of funds required for each goal.

Recommendations	Year 1 2007	Years 2-4 2008-10	Years 5-7 2011-13	Years 8-10 2014-16	Totals
1. Water/Energy Conservation, Repair & Retrofit, Education for all Sectors (Objectives A & B)	$7.0 mil	$21.0 mil	$21.0 mil	$21.0 mil	**$70.0 mil**
2. Water Agency Process & Regulatory Enhancements: A	$2.35 mil	$7.050 mil	$7,050,000	*program complete*	**$16,450,000**
B & C	$11.50 mil	$34.500 mi	$34.500 mil	$44.500 mil	**$115.000 mil**
3. New Energy- Efficient Water Resource Development A & B	$11.00 mil	$33.000 mil	$33.000 mil	$33.000 mil	**$110.00 mil**
4. New Environmentally-Friendly Energy Development A	$176.00 mil	$528.000 mil	$528.00 mil	$528.000 mil	**$1.760 Bil**

B	$11.500 mil	$34.500 mil	$34.500 mil	$34.500 mil	**$115.000 mil**
C	$13.700 mil	$41.100 mil	$41.100 mil	$41.100 mil	**$137.000 mil**
5. Governor's Water-Energy Summit	1,500,000	3,500,000	*program complete*	0	**$5,000,000**
Yearly/Period Total	**$223.5 MM**	**$702.7 MM**	**$699.2 MM**	**$692.1 MM**	**$2.317.5 B**

V. Status Report

Many but not all of the initiatives recommended in this Strategic Action Proposal for energy are moving forward at some level in portions of the San Joaquin Valley. Both PG&E and SCE have aggressive energy conservation/efficiency programs in a number of well-defined industrial sectors to include agriculture and food processing, water and wastewater agencies, to name only a few. The funding level of each utility program by industry segment in the eight county region is unknown nor is the expenditure in urban sectors.

Similarly, DWR and SWRCB have bond funded water related programs in the region. Water quality, quantity and management, as well as environmental habitat and restoration, are a focus of these programs. CalFed is in a restructuring mode currently and is much less of a factor than in previous years.

Typically the separate water and energy conservation/efficiency programs seldom converge for the greater public good. It is also quite rare to see air quality as a definition screen for either water or energy conservation/efficiency programs.

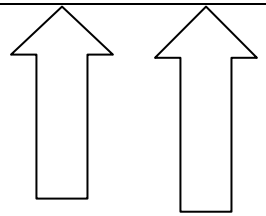
California water and energy stakeholders have a major opportunity to re-craft the future vision for these valuable resources.

VI. Attachments

A. Opportunity Areas to Advance San Joaquin Valley Water-Energy Stewardship

Attachment A

Opportunity Areas to Advance San Joaquin Valley Water-Energy Stewardship



Water-Energy Diagnostic, Retrofit & Premium Equipment Purchase

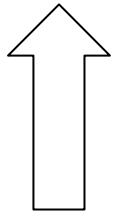
Implementation of water/energy diagnostic & retrofit programs across all segments

Implementation of Energy Star & SWAT™ 1st purchase and retrofit programs

SWAT™ = Smart Water Application Technologies Irrigation Association

Governor's Leadership to Facilitate Early Adoption of Converged Water-Energy Enhancement Opportunities

Convene Governor's Water-Energy Convergence Working Group to codify seamless local water agency self-generation & internal wheeling, expansion of Net-Metering & facilitate renewable grid interconnections



Water Agency Regulatory & Process Enhancements	New Energy Efficient Water Resource Development	New, Environmentally Friendly Energy Development
Water-energy pilot-program tariff Tariff coordination & installation of Time Of Use TOU and or tiered pricing water meters.	Expand recycled water reclamation and distribution	Expand Million Solar Roof program for water, wastewater, agricultural, and municipal agencies Solar Initiative
Paired off-peak reservoir storage enhancements and expanded agency storage tank and operational enhancements	Expand brackish water reclamation and distribution	Expand "back half" solar revolving loan program to encourage early adoption by agencies.
		Expand bio-based water agency, dairy digester co-generation